

temperature was 101°, his eyes were inflamed, and there was albuminuria; the calf and thigh muscles were extremely tender, and the deep reflexes were absent. Weil's disease was immediately suspected, and the blood urea was found to be 74 mg. per 100 ml. For four days he was very ill, but then rapidly became convalescent. The albuminuria disappeared and the blood urea fell to normal; but the sedimentation rate, which was 54 mm. per hour on admission, rose to 96 and remained high. For the next four weeks he felt perfectly well so long as he was kept in bed, but on the 40th day there was a transient recrudescence of fever accompanied by albuminuria. At no stage was he jaundiced, nor did the plasma bilirubin rise above 0.4 mg. per 100 ml.

**Case 4.**—The fourth patient was an airman, aged 22, who was scratched on the leg by a rat. Ten days later he suddenly felt feverish; he complained of headache and pains in the limbs and began to vomit. His temperature was 102°. The fever and symptoms persisted for seven days, when he was admitted to hospital. On admission his temperature was 101° and the conjunctivae were injected; there were no other physical signs and no albuminuria. Three days later he was afebrile and felt much better, but two weeks afterwards he suddenly developed mistiness of vision and was found to have punctate keratitis.

## COMMENT

In each of these four cases the diagnosis was confirmed by agglutination of the *Leptospira icterohaemorrhagiae* by the serum in a titre of 1 in 1600 or higher. Since then we have had a fatal case, with intense jaundice and uraemia, in an Italian prisoner who was employed in draining fields. Hitherto the number of non-icteric cases has been estimated at approximately 50%, though Kramer (1934) of Rotterdam reported 73 cases, of which only 28 developed jaundice, and in cases in which meningitis develops jaundice is more commonly absent than present (Lescher, 1944). The low incidence of jaundice in our series suggests that in the past many non-icteric cases have been missed. We think this would be less likely to happen if the name spirochaetal jaundice was not so misleading and if it was not too exclusively regarded as an occupational disease. Weil's disease should be suspected whenever the sudden onset of fever is associated with headache, pains in the limbs, and conjunctivitis. Albuminuria, a rise in the blood urea, and a high sedimentation rate are also characteristic. Once the cause is suspected the diagnosis is easily confirmed by the specific agglutination reaction. Our cases support the saying, "No jaundice, no death," but emphasize the importance of keeping the patient under observation for several weeks and allowing a prolonged convalescence.

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## A Case of Fat Embolism

We report a case of fat embolism presenting the unusual features of a delayed onset after operation without any of the premonitory chest signs.

## CASE HISTORY

The patient was a prisoner of war, aged 33. In Aug., 1941, he sustained a tangential bomb wound of his right humerus, with a fracture at the junction of the middle and lower thirds. He was admitted to a military hospital on Oct. 5, 1943, with complete non-union of the fracture. There was a well-healed scar on the outer side of his arm, with generalized muscle-wasting, but no evidence of nerve injury.

A bone-graft operation was performed on Oct. 12. The bone ends were freshened and a 4-in. intramedullary bone peg from the left tibia was introduced. A complete shoulder spica was applied. At the close of the operation the patient was somewhat shocked, and one pint of fresh blood was transfused. The early post-operative progress was satisfactory. After 12 days he complained of bleeding from his gums and there was purplish bruising round his left knee and ankle. He was given vitamin C; the stitches were removed from his left leg, which was well healed, and he started to get up and sit in the sun.

Three days later (Oct. 27) he was noisy and irrational at night and incontinent of urine; temperature 98°; pulse 80; no cough, dyspnoea, or cyanosis. The stitches were removed from the right arm via a window in the plaster. The wound healed cleanly, though bruising round the left knee and ankle was more marked. Knee- and ankle-jerks were exaggerated; plantar response was doubtful. There was no evidence of any paralysis. The optic disks appeared normal. Intravenous glucose-saline given. Urine: albumin +; sugar ++++; ketones +; fat globules present. Blood sugar, 170 mg. per 100 c.cm.

Next day (Oct. 28) his general condition had deteriorated: temperature 97°; pulse 88. He was kept tranquil only with luminal and morphine. The plaster spica was removed from the back. Examination of the chest revealed moist crepitations at bases only; no sign of consolidation. On the 30th there was a slight improvement. He was quiet all day without a sedative. On Oct. 31 he was rational.

Drip saline was discontinued after infusion of 36 pints in 3½ days. His condition then rapidly improved. A new plaster spica was applied on Nov. 2, and on Nov. 3 he started to get up.

**Laboratory Investigations.**—The blood and urine examinations are best demonstrated in a table, as follows:

Date	Blood Sugar (mg. per 100 c.cm.)	Urine					
		Albu- min	Sugar	Ketones	Acetone	Fat	Casts, Granular and Hyaline
27/10/43	170	+	++++	+	—	+++	—
28/10/43	160	+	++++	+	—	Not tested	—
29/10/43	150	+	—	—	—	..	—
31/10/43	140	+	Trace	—	—	..	—
1/11/43	140	+	..	—	—	..	—
3/11/43	100	+	—	—	—	—	—
4/11/43	100	+	—	—	—	—	—
13/11/43	—	Trace	—	—	—	—	—
16/11/43	—	—	—	—	—	—	—

The tests employed were: (1) Benedict's test for sugar in the urine. (2) Crocclius-Seifert picric acid method for blood-sugar estimation. (3) Fat in the urine was demonstrated by staining with Sudan III. Globules of fat varied in size from a few to 30-40 microns in diameter. It was also demonstrated indirectly by the "sizzling test." In this test, adopted by Major J. V. Wilson, R.A.M.C., a loopful of fat-containing urine is burnt in a spirit flame and makes a distinct sizzling, which is very striking compared with that of normal urine. (4) No sputum was available for fat-globule staining.

## COMMENT

The glycosuria and blood-sugar level cannot be entirely explained by the intravenous glucose-saline, because, while this was maintained approximately constant, the blood sugar and glycosuria progressively diminished. Also, the glucose was given at the rate of 0.12 g. per kg. of body weight per hour, whereas in the experimental animal it can be injected at a rate of 0.9 g. per kg. per hour before it appears in the urine. The glycosuria would therefore seem to be, at least in part, of renal origin.

Evidence of renal damage is afforded by the presence of albuminuria and casts, and may be assumed to be due to fat embolism of the kidneys. Glycosuria might thus have resulted from a selective renal damage comparable to that caused by phloridzin. If it occurs with any constancy in fat embolism it might be a point of diagnostic significance. It was observed in another case of fat embolism occurring in 2 N.Z.C.C.S. in the Western Desert in Nov., 1942, which at necropsy was proved to have extensive fat embolism of the kidneys and other organs. Albuminuria and ketonuria were present, but the clinical features and other circumstances of the case differed considerably from the one under review.

We are indebted to Lieut.-Col. A. Cruickshank, R.A.M.C., for permission to publish this case.

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## Torsion of the Gall-bladder

The rarity of the above condition, I hope, warrants its publication; it is the first such case that I have seen in over 30 years of practice.

Miss A., aged 67, in normal health, was reaching up to put a shilling in a slot meter on Feb. 4 when she was seized with acute abdominal pain under the right costal margin. She was not sick and thought it might be appendix trouble, so she starved herself to some extent as her own means of treatment. The pain persisted, and on Feb. 7 she sent for her doctor. At this time the patient had no rise of temperature or pulse rate, and no sickness, but her pain was severe, and a tender lump was palpable below the costal margin.

I was asked to see her on Feb. 8 and found the conditions as above. The patient was transferred to a nursing home on the 9th, and Dr. Shera, the pathologist, kindly did a white count for me, which showed 6,800 leucocytes only. On Feb. 10 I performed a laparotomy, making a Kocher's gall-bladder incision. The transverse colon was adherent to the liver edge; this separated readily with a gauze swab, and immediately the gall-bladder came into the wound with a long pedicle which untwisted easily. It had been lying in a bed formed by coagulated lymph and exudate. I removed the gall-bladder, ligatured the cystic duct with catgut, drained the cavity, and closed the abdomen. The gall-bladder was found to have two medium-sized stones in it, and was tense and full of almost pure blood. There was no infection.

The patient made an uninterrupted recovery, and went home on March 8.

I am greatly indebted to Dr. Downing for allowing me to publish this case, and to Dr. Shera for the blood count.

Eastbourne.

E. WILSON HALL.